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STUDENT ESSAY

THE IMPACT OF GRADUATE MEDICAL EDUCATION ON ARMY MEDICAL READINESS

BY

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27 MAY 1987

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER	2. GOVT ACCESSION NO. A182 758
3. RECIPIENT'S CATALOG NUMBER	
4. TITLE (and Subtitle) The Impact of Graduate Medical Education on Army Medical Readiness	5. TYPE OF REPORT & PERIOD COVERED Individual Essay
	6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Colonel Paul L. Shetler	8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS U.S. Army War College Carlisle Barracks, PA 17013	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS	12. REPORT DATE 27 May 1987
	13. NUMBER OF PAGES 44
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)	15. SECURITY CLASS. (of this report) Unclassified
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

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quality of medical care, medical readiness, and graduate medical education have become inseparably interdependent. Recent societal trends in civilian graduate medical education threaten the continuation of the Army's programs. Unless the Army effectively deals with these dangers, the concomitant pressures on quality of patient care and medical readiness will be unanswerable. By discontinuing its stand alone programs and affiliating with civilian teaching centers, the Army medical department could preserve the benefits of graduate medical education without the excessive drain on medical manpower currently experienced.

USAWC MILITARY STUDIES PROGRAM PAPER

THE IMPACT OF GRADUATE MEDICAL EDUCATION

ON

ARMY MEDICAL READINESS

INDVIDUAL ESSAY

by

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May 27, 1987

ABSTRACT

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TITLE: The Impact of Graduate Medical Education on Army Medical Readiness

FORMAT: Individual Essay

DATE: 27 May 1987 PAGES: 42 Classification: Unclassified

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INTRODUCTION

The combat ready soldier, threatened by injury or disease, counts on having a combat ready doctor to debride his wounds, preserve his health, and treat his ills. Medical support for American soldiers has not always met this reasonable expectation. A historian, writing of the American Civil War, flatly states, "The Army Medical Department entered the war unprepared." He continues, "Fortunately the Medical Department was not long left to its own devices. Public demand led to the creation of the United States Sanitary Commission, which was to act as a gadfly in stinging the moribund department into more effective activity."[1]

One hundred twenty years later, the conduct of the Army Medical Department continues to stimulate profound interest, concern, and proposals for corrective action on the part of national political leaders. Complaints regarding the quality or availability of medical care [2], medical care for military retirees [3], reliance on the Reserves for medical readiness [4], and the military relevance of GME [5] are just a few of the items recently featured in federally related newspapers.

Half the physicians in the U.S. Army today are currently involved with a program, conceived in the Civil War [1] and born shortly after WW I [6], to ensure that sufficient numbers of combat ready, competent physicians wear the Army uniform. Since this program of graduate medical education (GME) involves so many Army physicians as students, teachers, or direct supporters, it is bound to have a major impact on the combat readiness of the Army Medical Department (AMEDD). The major committment of AMEDD resources to GME has been criticized for placing priority on GME ahead of medically supporting soldiers in peace, and preparing to support them in war.

Medical readiness is a complex issue with a multitude of both subjective and objective parameters affecting any assessment. The essence of medical readiness, however, ultimately returns to one unifying act—a medical team competently treating a patient. This is the primary responsibility of the AMEDD, to "...provide the best and most current medical support to our soldiers in time of war."[7] Physicians who are unprepared to render such support in peace, are certainly not ready to do so in war.

This study reports on where the Army doctors are, where

they provide medical care, where the Army trains them to be medical specialists, and what types of specialists the Army is training. An analysis of this information offers some perspective on the impact of GME on Army medical care and medical readiness. The review concludes with some proposals for charting a future course for graduate medical education.

MATERIAL AND METHODS

Three different offices within the Office of the Surgeon General, United States Army (OTSG) supplied the following data covering the years 1980–1986 inclusive. Trends were evaluated for statistical significance using regression analysis. The two-tailed t statistic provided probability values for matched data pairs.

Army medical treatment facilities vary in capability according to the type of facility. A troop medical clinic (TMC) supports outpatient care at a lower level of sophistication. The TMC medical staff come from the line units the TMC supports. The Army Health Clinics have greater outpatient capabilities with some medical specialists and more complex equipment. Their medical staff are primarily from medical commands rather than the line units. Medical care in both types of clinics is usually summarized in the workload reports of the community hospitals. The community hospitals provide inpatient medical and surgical care for common, relatively uncomplicated conditions. Medical centers offer inpatient care for complex conditions requiring highly sophisticated equipment, the major medical specialties, and many subspecialties.

Table 1. summarizes the geographic location of Army

physicians assigned to one of the eight regional Medical Centers (a MEDCEN), or to one of the Community Hospitals/Health Clinics (a Medical Department Activity or MEDDAC) subordinate to Health Services Command (HSC) in the United States, the 18th Medical Command (MEDCOM) in Korea, and the 7th MEDCOM in Europe. The total number of physicians in the Army also includes division and brigade surgeons, special staff surgeons at the corps or higher level, physicians at the OTSG, physicians in Medical Research and Development Command, and the few physicians in GME training in non-Army institutions. A breakdown of the operational physicians was not separately available, but was calculated by subtracting the number of MEDDAC, MEDCEN and non-Army GME physicians from the AMEDD totals.

Table 1.

Location	1980	1981	1982	1983	1984	1985	1986
MEDCEN	2089	2140	2189	2185	2258	2297	2327
HSC-MEDDAC	1055	1176	1230	1269	1359	1347	1352
Europe[1]	440	456	472	474	484	499	515
Korea[2,3]	67	63	65	65	61	64	56
Operational[4]	633	809	855	985	915	1015	1004
AMEDD	4402	4765	4905	5054	5163	5317	5317

US ARMY Physician Distribution by Major Activity

1. Assigned to 7th Medical Command.
2. Assigned to 8th Medical Command.
3. Includes 3 per year in Japan.
4. Calculated by subtracting the MEDCEN and MEDDAC physicians from the AMEDD total. Includes TO&E units, MED R&D Command, etc.

MEDDACs and MEDCENs submit monthly reports on the quantity of medical care they provide in terms of average number of hospitalized patients (ADPL) each day, number of daily outpatient clinic visits, average number of admissions each day (ADM), and average number of live births each day. These numbers are also combined in Medical Care Composite Units (MCCU) calculated from the equation:

MCCU = ADPL + 10*ADM + 0.3*CLINIC VISITS + 10*Births

Table 2 - Table 6 report yearly collations of the work load parameters reported by the MEDCENs and MEDDACs.

Table 2.

Location	1980	1981	1982	1983	1984	1985	1986
MEDCEN	3616	3606	3476	3405	3441	3305	3257
HSC-MEDDAC	2696	2601	2606	2538	2985	2387	2332
Europe	1041	1006	978	912	918	916	902
Korea	124	114	116	110	111	115	129
AMEDD	7476	7227	7176	6965	6955	6732	6620

Average Daily Patient Load by Type Hospital

Table 3.

Location	1980	1981	1982	1983	1984	1985	1986
MEDCEN	379	387	384	387	392	403	396
HSC-MEDDAC	509	519	541	536	543	536	546
Europe	173	169	171	170	174	180	178
Korea	17	16	17	18	18	20	23
AMEDD	1079	1091	1113	1111	1128	1139	1142

Average Daily Admissions by Type Hospital
*. Rounded numbers may vary in last digit.

Table 4.

Location	1980	1981	1982	1983	1984	1985	1986
MEDCEN	1912	1973	1999	2092	1960	1937	1964
HSC-MEDDAC	3176	3206	3258	3251	3117	3075	3072
Europe	916	910	927	952	962	992	989
Korea	128	120	126	126	126	132	147
AMEDD*	6132	6209	6309	6421	6164	6137	6171

1/10 of Average Daily Clinic Visits by Type Hospital
*. Rounded numbers may vary in last digit.

Table 5.

Location	1980	1981	1982	1983	1984	1985	1986
MEDCEN	353	348	363	359	346	347	324
HSC-MEDDAC	523	528	568	605	602	580	576
Europe	260	252	268	281	284	298	286
Korea	16	15	16	17	23	24	25
AMEDD	1152	1143	1215	1262	1255	1249	1211

10 times Average Daily Live Births by Type Hospital

Table 6.

Location	1980	1981	1982	1983	1984	1985	1986
MEDCEN	13499	13741	13672	13907	13587	13489	13429
HSC-MEDDAC	17838	17936	18358	18261	17872	17568	17587
Europe	5780	5678	5734	5749	5831	5988	5931
Korea	695	647	679	686	694	731	831
AMEDD	61317	62085	63087	64212	61644	61367	61411

Average Daily MCCU by Type Hospital

Graduate Medical Education includes the first or intern year, subsequent years of formal training for specialization, and fellowship training in a subspecialty. Most of the GME in the Army occurs in the eight MEDCENs. In addition, four large MEDDACs have conducted programs in family practice or emergency medicine. A few Army physicians receive training in Air Force, Navy, and civilian medical centers.

The office of GME in the OTSG provided copies of the work sheets which listed the number of interns, residents, and fellows in each specialty, in each of the Army training hospitals, the combined civilians institutions, and in Air Force or Navy institutions. Although these worksheets contained combined summaries by location and type of training, the summaries were not used. Instead, the raw data from these worksheets were used to construct the following data Tables on GME.

Table 7-Table 10 contain the number of interns, residents, and

fellows enrolled in GME according to the type of training facility.

Table 7.

Location	1980	1981	1982	1983	1984	1985	1986
MEDCEN	377	339	337	316	323	329	308
MEDDAC	29	30	31	30	32	34	33
AMEDD	406	369	368	346	355	363	341

US ARMY Interns in Graduate Medical Education

Table 8.

Location	1980	1981	1982	1983	1984	1985	1986
MEDCEN	1001	998	989	959	924	987	983
MEDDAC	60	63	72	61	61	72	79
AF/Navy	0	6	12	5	0	7	6
Civilian	58	67	53	43	49	43	23
AMEDD	1119	1134	1126	1068	1034	1109	1091

US ARMY Residents in Graduate Medical Education

Table 9.

Location	1980	1981	1982	1983	1984	1985	1986
MEDCEN	197	201	201	195	196	207	210
AF/Navy	1	1	0	0	0	2	2
Civilian	59	47	29	28	27	43	32
AMEDD	257	249	230	223	223	252	244

US ARMY Fellows in Graduate Medical Education

Table 10.

Location	1980	1981	1982	1983	1984	1985	1986
MEDCEN	1575	1538	1527	1470	1443	1523	1501
MEDDAC	89	93	103	91	93	106	112
AF/Navy	1	7	12	5	0	9	8
Civilian	117	114	82	71	76	86	55
AMEDD	1782	1752	1724	1637	1612	1724	1676

US ARMY Physicians in Graduate Medical Education

The first year of graduate medical education is often referred to as an internship. The internship may be limited to a specific

specialty field (the categorical internship), or may involve a broader experience in all the major specialties (a rotating, flexible, or transitional internship). Earlier categorical internships included a number of specialties, however the Army has more recently limited the types of categorical internships it offers. Table 11 shows the number of interns by type of specialty.

Table 11.

Type	1980	1981	1982	1983	1984	1985	1986
Flexible[1]	99	84	85	80	87	100	103
Emergency Med	4	4	4	4	4	4	4
Family Prac	50	53	53	47	43	45	43
Medicine[2]	88	81	79	80	81	82	75
OBGYN	27	24	22	21	22	22	22
Pathology	12	9	8	10	12	0	0
Pediatrics	35	27	27	27	28	33	29
Psychiatry	18	14	16	13	14	14	14
Radiology	10	10	10	0	0	0	0
Surgery[3]	63	63	64	64	64	63	51
Totals	406	369	368	346	355	363	341

Distribution of Interns by Specialty

1. Once known as Rotating Interns, and now called Transitional interns.
2. Includes physical med in 80-82, neurology, and a combined medical/pediatric program.
3. Includes anesthesiology in 80-85

A residency includes the years of training after the internship which lead to medical specialization and certification by a specialty board. Board certification can occur on completion of an approved residency after an examination. The American Council on Graduate Medical Education (ACGME) is the approving authority for

the training programs leading to board certification. Table 12 shows the residency programs the Army sponsored by type of specialty.

Table 12.

Type	1980	1981	1982	1983	1984	1985	1986
AeroSpace Med	5	7	10	11	11	12	8
Emergency Med	26	36	43	41	37	41	39
Family Prac	101	98	107	97	95	93	97
Internal Med[1]	185	173	160	145	143	160	154
Neurology	18	20	21	17	16	19	20
Prev. Med	16	18	14	8	13	20	8
Dermatology	46	37	35	30	30	25	24
Physical Med	6	7	5	6	6	9	8
OBGYN	92	94	99	86	87	88	88
Pathology	66	62	53	50	47	61	59
Pediatrics	72	69	66	59	57	65	69
Psychiatry	57	55	49	51	49	58	54
Radiology-Diag	96	89	87	80	75	73	85
Rad-Oncology	5	5	3	5	5	11	10
General Surgery	93	96	101	101	98	104	100
Anesthesiology	52	60	57	56	55	57	58
Neurosurgery	9	13	12	12	11	15	13
Ophthalmology	38	36	36	34	31	33	31
Orthopedics	61	79	92	105	99	97	99
Otolaryngology	41	45	46	45	42	41	39
Urology	34	35	30	29	27	27	28
Totals	1119	1134	1126	1068	1034	1109	1091

Distribution of Residents by Specialty

1. Includes Combined Med/Ped Residents.

Over 70 different types of specialty/subspecialty training were combined into eight major categories of fellowship training in Table 13 and the summary of specialty training in Table 14. The Broad-based programs and those not leading to board certification in traditional specialties or subspecialties have been combined in the

general category in Table 14.

Table 13.

Type	1980	1981	1982	1983	1984	1985	1986
Mil Med Science	0	0	0	2	2	4	4
Family Practice	0	0	1	2	2	5	7
Medicine[1]	145	146	140	127	128	134	129
OBGYN	8	10	6	10	9	10	10
Pathology	4	2	0	1	1	3	4
Pediatrics	41	35	26	23	22	34	32
Psychiatry	13	11	12	13	13	20	16
Radiology	12	15	18	17	17	14	10
Surgery[2]	34	30	27	28	29	28	32
Totals	257	249	230	223	223	252	244

Distribution of Fellows by Specialty

1. Includes all Neurology, Physical Medicine, Preventive Medicine, Allergy, and Dermatology Fellowships.
2. Includes Thoracic Surgery, Vascular Surgery, and Plastic Surgery in addition to the Surgical Subspecialties.

Table 14.

Type	1980	1981	1982	1983	1984	1985	1986
General*	285	282	303	284	281	304	305
Medicine	504	482	454	413	417	449	418
OBGYN	127	128	127	117	118	120	120
Pathology	82	73	61	61	60	64	63
Pediatrics	148	131	119	109	107	132	130
Psychiatry	88	80	77	77	76	92	84
Radiology	123	119	118	102	97	98	105
Surgery	425	457	465	474	456	465	451
Totals	1782	1752	1724	1637	1612	1724	1676

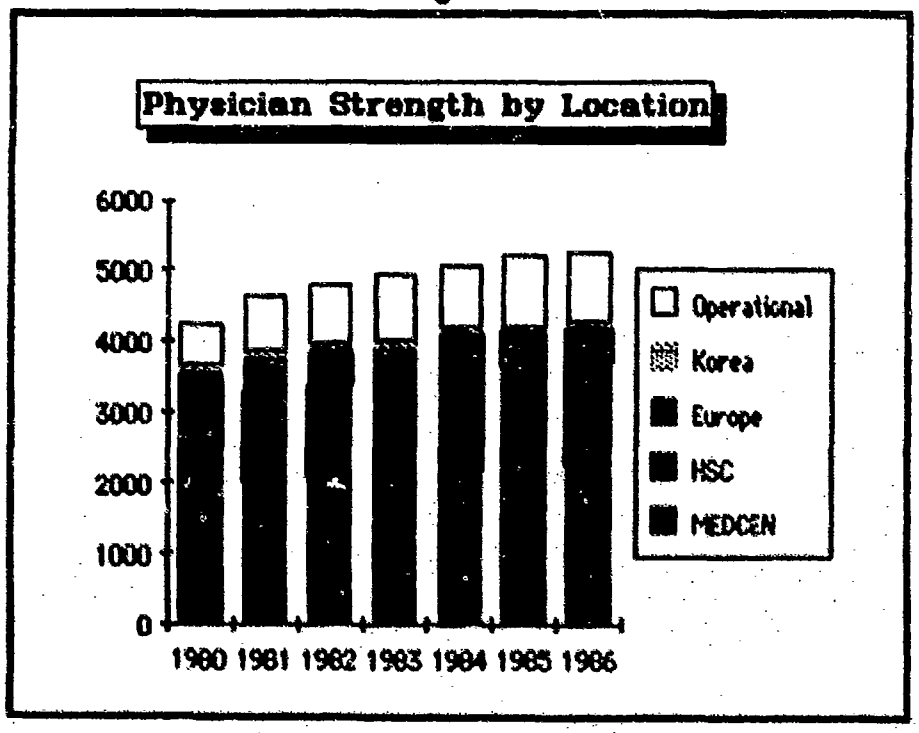
Combined Distribution of Trainees by Specialty

*. Includes Military Medical Science, Family Practice, Emergency Medicine, Aerospace Medicine, and Flexible/Transitional Interns.

RESULTS

The significant increase ($p<.01$) in the strength of the AMEDD by over 900 physicians between 1980 and 1986 must rate as the most important single factor affecting medical readiness. Figure 1 graphically illustrates this major increase in the overall number of doctors and where they were assigned.

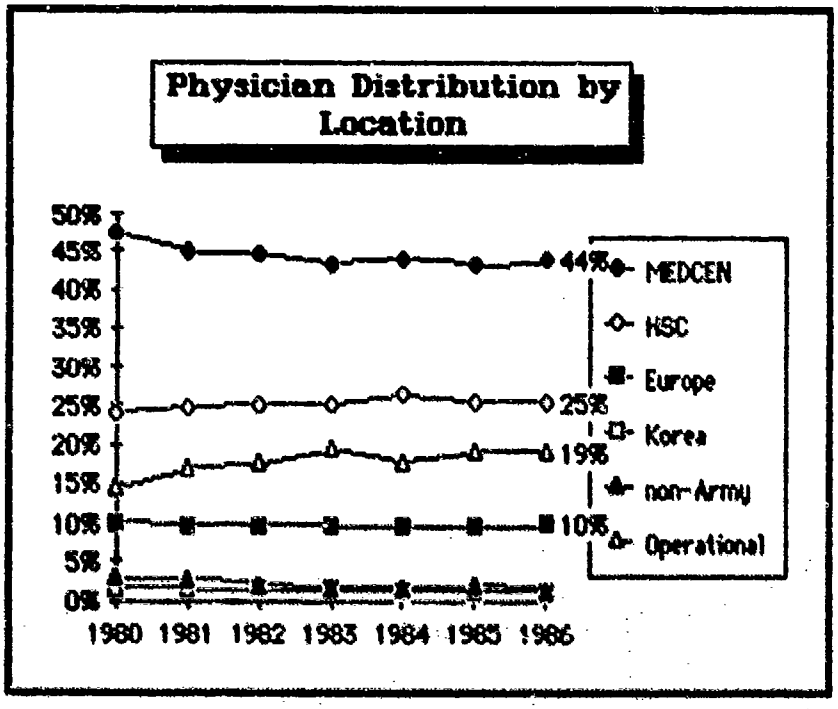
Figure 1.



With the exception of Korea, more and more doctors each year were treating soldiers and supporting Army units throughout the world. Contrary to a fairly common misconception in the AMEDD, the medical centers shared relatively less of this increase compared to the rest of the AMEDD. The manpower pool supporting operational assignments to line units benefited the most

with medical support for combat readiness of line units as a major beneficiary of this trend. The changes in staffing patterns are clearly seen in Figure 2.

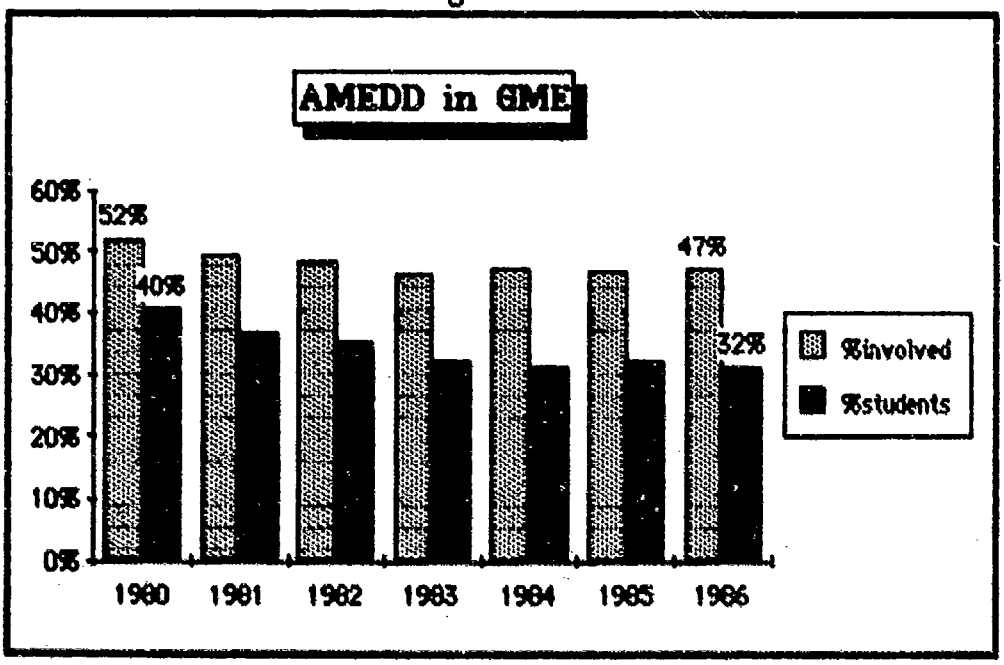
Figure 2.



In contrast to the growth in physician strength, the number of physicians in GME has drifted down. Physicians may be involved with GME as teachers, as students, or as consultants in their specialties on teaching hospital patients. The sum of all MEDCEN physicians and all students in GME outside Army MEDCENs indicates that slightly more than one-half of the Army physicians in 1980 were involved with GME and 40% were students in GME (see Figure 3). Although the absolute numbers

in GME each year have not decreased significantly ($p>.05$), the percentage has decreased significantly ($p<.01$). The fact remains, a sizable proportion of AMEDD physicians were still involved in GME in 1986.

Figure 3

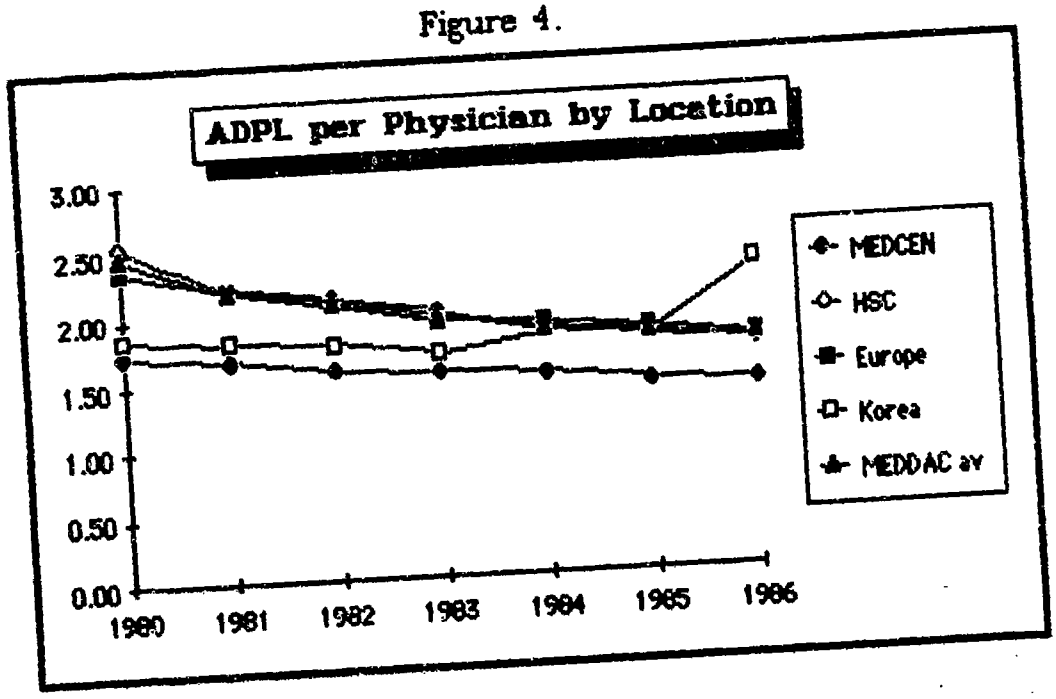


It is much easier to count physicians than measure the workload they carry. Intuitively, it seems reasonable to conclude that if more patients are seen in the clinics and admitted to the hospital, more work is being done. The MCCU reflects this line of reasoning and has been used to evaluate Army medical "productivity." The trend towards outpatient rather than inpatient care highlights the fallacy inherent in abusing the MCCU as a productivity measure (compare Tables 3 & 6). An inguinal

hernia repair, performed as an inpatient surgical procedure, counts as at least 11 MCCUs (10 for admission, 1 for one hospital day). The same operation, requiring the same operating room support, counts as 1/10 MCCU when performed as an outpatient procedure. The complex open-heart patient, requiring two weeks in the intensive care unit after surgery, generated the same 1 MCCU/day plus 10 MCCU/admission as the soldier with the "flu" who lives in the barracks and for whom "quarters" is impractical.

Although the pattern of medical practice in the Army shares the civilian trend towards outpatient care, the number of patients the physician is treating still seems the most straightforward parameter for studying where medical care is given in the Army and who is giving it. The average daily patient load (ADPL) has some flaws, but at least the ADPL refers to a patient receiving care in a hospital bed. The ADPL per physician in the MEDDACs has decreased in parallel with the ADPL per physician in the MEDCEN, but the two differ significantly ($p<.01$) as seen in Figure 4.

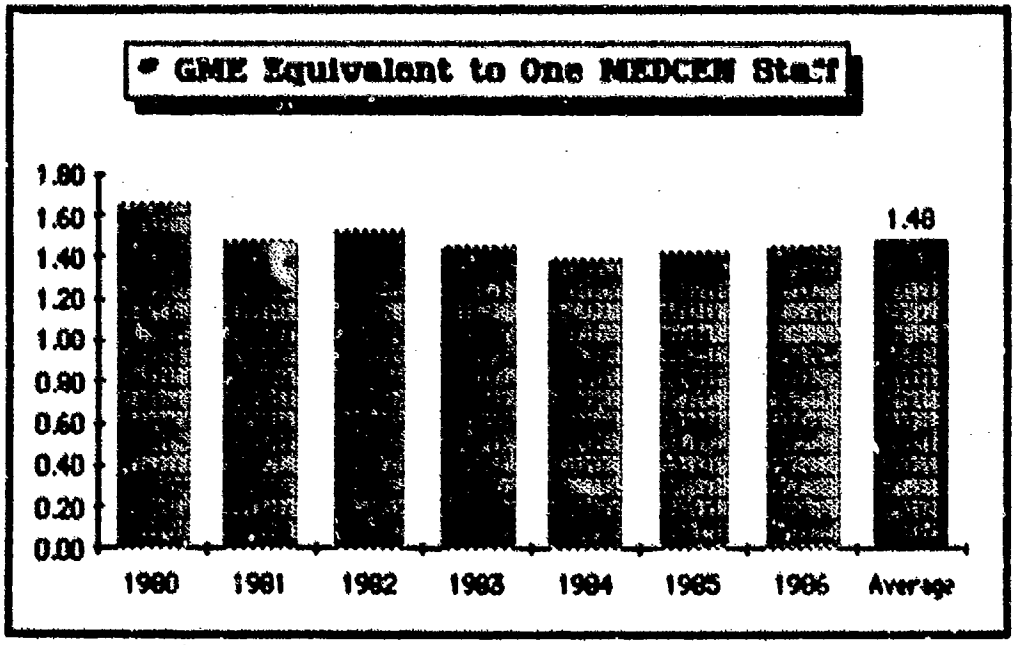
Figure 4.



The MEDCENSs care for more patients in the hospital each day, but the MEDCENs also have more doctors. Each MEDCEN doctor on the average carries a smaller patient load than does his MEDDAC colleague. Part of this difference can be attributed to the more complex illnesses seen in the MEDCEN, but most of this difference must be attributed to the "overhead" created by GME. Teaching activities simply require more physicians than would be required by patient care alone.

If there were no GME conducted at the MEDCEN, additional staff physicians would be required to provide the patient care given by the interns, residents and fellows. This number is relatively easy to calculate by dividing the MEDCEN ADPL by the ADPL per physician in the MEDDACs and subtracting the number of teaching staff already assigned to the MEDCENs. The number of GME students, divided by the number of additional staff required if there were no GME, gives the GME to teaching staff equivalent. Figure 5 discloses the results of these calculations.

Figure 5.



There is no statistical significance to the yearly changes. On the average, three GME students are equivalent to two staff physicians by this calculation. If the GME program at a MEDCEN

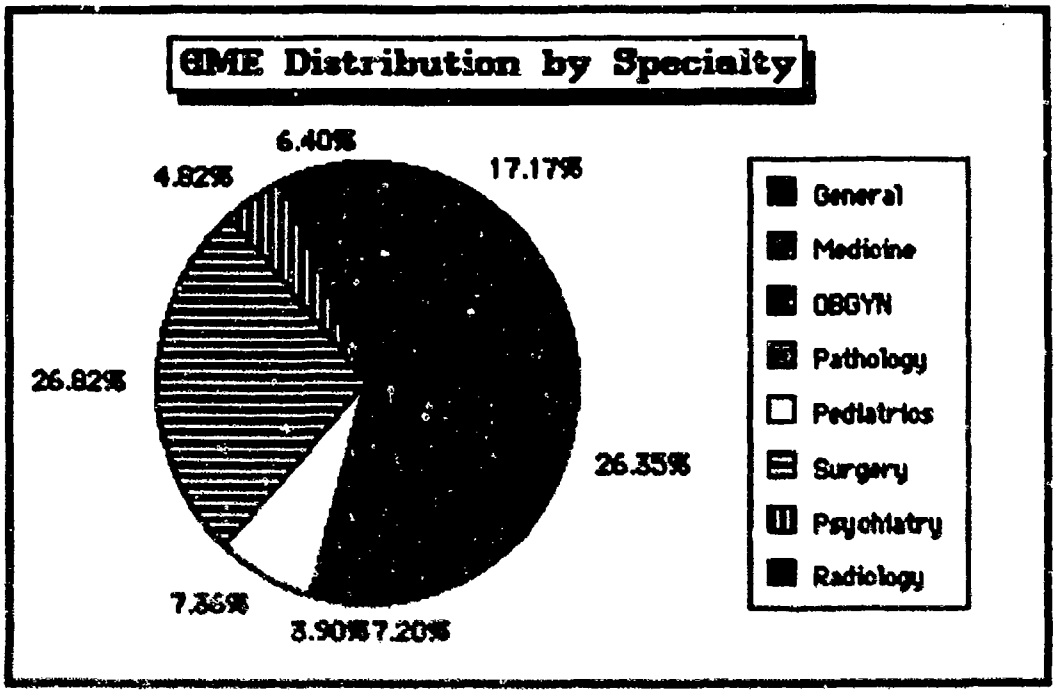
were reduced by three spaces, two of the three spaces would immediately revert to the MEDCEN to provide the same level of patient care for a net gain of one space. These results imply the pool of GME students immediately available upon mobilization would be closer to 400 (⅓ of MEDCEN & MEDDAC residents and fellows), rather than a full 1200, unless patient care were curtailed.

The concept of GME overhead carries another interesting implication. Most residents and interns train at medical centers but graduate to MEDDAC or operational assignments. Fellowship training, however, provides the additional subspecialty expertise required primarily in medical centers. Although some fellows go to MEDDACS or receive operational assignments and some residents stay at the MEDCENs as staff or fellows, fellowship training can be viewed as GME overhead for operating MEDCENs. If MEDCENs were eliminated and complex cases were treated in civilian medical centers, there would be little need for most of the suspecialties in the Army, and no place in the Army for these superbly trained physicians to conduct their practice. This overhead for medical excellence nonetheless constitutes 15% of Army GME.

The proportion of GME in combat-required specialties deserves close attention during any evaluation of the impact of GME on medical readiness. If combat casualties are considered to be only those soldiers with fragment wounds and shell shock than the surgery and psychiatry would be the combat required specialties. Combat casualties from trench foot, malaria (and other infectious diseases), and lack of camp sanitation imply that internal medicine and pediatrics could be appropriately added to the combat-required specialty list. Laboratory and x-ray support are essential for quality care of wounded soldiers, so radiology and pathology belong on the combat-required specialty list also. In view of the team approach so often used in modern medical care, it would seem more appropriate to view any multispecialty, flexible medical team as composed of combat-required specialties.

The major categories of medical specialtics in Army GME have remained relatively unchanged between 1980 and 1986, although there have been wide variations in the numbers for individual specialties as listed in Table 14. Figure 6 summarizes the basic specialty mix that has obtained during the past seven years.

Figure 6.


GME Distribution by Specialty
6.40%
17.17%
4.82%
26.82%
26.35%
7.36%
3.90%
7.20%
General
Medicine
OBGYN
Pathology
Pediatrics
Surgery
Psychiatry
Radiology

DISCUSSION

Historical Overview

The battle at Manassas in 1862 was a major defeat for the Union Army and an unmitigated disaster for the Medical Department. Some wounded soldiers remained untreated on the battlefield for a week. The system for clearing the battlefield failed completely, the quality of medical care was deplorable (even by 1862 standards), hospital beds were scattered all over Washington, many wounded soldiers were administratively lost, and the supply system broke down completely. short-term and long-range reform was mandatory and a reform surgeon general was appointed.

After six months as Surgeon General in 1862, General William Hammond had developed a number of plans to reform the woefully inadequate AMEDD. He recognized that top quality medical care requires physicians who possess current scientific knowledge. "He proposed establishing a great graduate school of medicine in Washington where the medical officers of the Army could be kept in touch with advances in the sciences. It was to include an Army medical museum, whose pathological and surgical exhibits would be contributed by the surgeons in the Army hospitals, and an Army medical school operated in connection with a general hospital. After

the war this central hospital was to serve as a permanent center of clinical instruction."[1]

General Hammond recognized that the Army could not attract and retain good physicians if they saw few opportunities for recognition and professional advancement. The rest of the Army, however, did not fully share his insight. " 'If the purely military portion of the service chooses the standards of the middle ages, when barbers, farriers, and sow-gelders ... constituted the medical staff of armies,' said one surgeon, 'they ought not to complain when they have the misfortune to fall into the hands of medical officers of a quality and character little superior to the leeches of the days of Charlemagne.' "[1]

Reform ideas were implemented but not all immediately. The Army Medical Museuem, renamed the Armed Forces Institute of Pathology, was established in 1862 while the Army Medical School, renamed the Walter Reed Army Institute of Research, was not established until 1893. In 1894 Colonel William H. Forwood, MD, Professor of Military Surgery at the Army Medical School, started a formal program of lectures, dissections, ward rounds, and operating room experience for graduate physicians wishing to become surgeons. This was one of the earliest formal training programs in surgery in

this country but did not develop into one of today's GME programs.[8]

General Hammond's ideas on general hospitals, and post-graduate training took longer. Except for the Army and Navy General Hospital at Hot Springs, Arkansas, the Army did not have general hospitals in time of peace until the Spanish-American War was followed by the occupation of Cuba, Puerto Rico, the Philippines, and Hawaii. General hospitals in war concentrated the medical specialists and sophisticated equipment with the medically complicated patients to give them better care. The size of the standing Army and the medical diseases of the tropics ensured that the general hospitals remained open. The practice grew of transferring dependents who needed the same quality of care if it was unavailable locally.

Of the six general hospitals remaining open after the war, five became Army Medical Centers of today. These include Brooke Army Medical Center in San Antonio, Letterman Army Medical Center at the Presidio of San Francisco, Tripler Army Medical Center in Honolulu, Fitzsimons Army Medical Center at Denver (originally organized at Fort Bayard, New Mexico and moved after WW I), and Walter Reed Army Medical Center in Washington, D.C.[6] The

other three medical centers are William Beaumont Army Medical Center at El Paso, Madigan Army Medical Center at Ft. Lewis, Washington, and Dwight David Eisenhower Army Medical Center at Augusta.

Graduate Medical Education as we know it today began in 1920 when the War Department authorized Army Internship Programs at Walter Reed General Hospital, Letterman General Hospital, Fitzsimons General Hospital, Tripler General Hospital, and the Station Hospital at Ft. Sam Houston, Texas.[8] The programs were developed as a new method of recruiting high-quality officers for the Medical Corps, "... by accepting as internes in our largest and best hospitals especially recommended new graduates of Class A medical schools, giving them a year of interneship and then giving them commissions if their conduct and work recommend them and they desire to remain in the service."[6] These programs brought good doctors into the Army, but it neither created medical specialists, nor kept good doctors in the Army.[9] Apparently the Army still did not fully share General Hammond's Civil War perception that good doctors will join up (and remain in) only if they see opportunities for professional satisfaction and advancement.

The next major change to Army GME followed close on the severe turbulence that WW II brought to both medical school education and civilian GME. The quality of medical care in the Army during WW II was superb due in part to a massive influx of specialists and medical teams based on the sponsorship program in which medical schools and large civilian hospitals provided the Reserve staff for thirty-two general hospitals, seventeen evacuation hospitals and thirteen surgical hospitals.[10] The small number of specialists in critical areas forced the AMEDD to institute crash programs to train the specialists needed for global warfare. The cessation of hostilities and a rapid exodus of physicians left only 71 board-certified specialists (thirteen of whom were in surgical specialties) in the entire AMEDD by 1946. The entire AMEDD was down to only two board-certified general surgeons. In describing the system fix for this situation, General Thomas Whelan quotes its author Surgeon General Raymond Bliss. "I am sure you are well aware that professional quality is the keynote of our new orientation. We want our doctors to grow professionally. We want them to practice medicine in the Army equal to the best in civilian life. The above will be attained through post-graduate training."[11]

The Army Residency Programs began in 1946 and later expanded into larger Army Community Hospitals as well as the Medical Centers under General Leonard Heaton's guidance. They were intended to retain within the peacetime Army the influence on quality of medical care brought by the WW II influx of civilian specialists. [12]

The decade from 1959 to 1969 marked the reign of an extraordinarily dynamic surgeon general who left his indelible mark on the AMEDD. Lieutenant General Leonard Dudley Heaton vigorously backed expansion of Army GME, accreditation of Army hospitals, and support for Medical Research based on a clear vision which he inculcated in the AMEDD as its operating philosopy. He called it the five pillars of military medicine which he saw as supporting a goal, "The goal is the practice of total medicine."[13] The pillars are:

(a) The practice of medicine including the art of medicine as well as curative and preventive medicine;

(b) field medicine or combat readiness;

(c) medical education and training;

(d) medical research and development;

(e) medical administration and management.

By 1972 more that 1100 Army medical officers were in training. Although the number of Army physicians began shrinking from a Viet Nam War high of 7000 in 1970 to only 4420 in 1976, the number in GME was maintained above 1100 or 25% of all Army physicians. [14]

The post-Viet Nam slump in numbers of Army physicians was particulary alarming because Selective Service no longer provided a safety net. In 1981, after four years as Surgeon General, General Charles Pixley reviewed the steps he took, and the reasons why he took them, before a congressional committee. [7]

Physican strength had fallen further to 4056 in 1977 and constituted General Pixley's most pressing problem. Physician manpower problems were compounded by "maldistribution of the specialty mix" with "shortages of Orthopedists, General Surgeons, Internists, Radiologists, Otolaryngologists, and Ophthalmologists." He saw the medical centers as having the primary role in AMEDD readiness in terms of training, quality health care, mobilization,

and care of evacuees.

The Health Professional Scholarship Program (HPSP) has been very effective, highly competitive program for introducing young medical school graduates to Army medicine. Medical students join the Reserves, enjoy a generous scholarship to defray medical school expenses, meet part of their medical school requirements for clinical rotations in Army hospitals during annual Reserve active duty time. Upon graduation from medical school, most HPSP students apply for Army internships and enter Army GME. By emphasizing HPSP and Army GME despite severe physician shortages, General Pixley faced severe criticism when he set his priorities, but his investment in the future has paid off many times over in both quantity and quality of Army physicians.

Defining Readiness

"Readiness" is an ugly, awkward word, but will have to do until a short, dynamic synonym comes to the rescue. Army medical readiness must be viewed in the context of strategic requirements for the entire Army. GME contributes to medical readiness to the degree it contributes to AMEDD support for the types of missions the Army will be tasked to perform. The proportion of doctors involved in GME, and the mix of training programs should depend to some

degree on the care the soldiers will require when they deploy. Even as the traditional forces tailored for a European, high-intensity, conventional conflict are inappropriate for deployment against terrorists; so the war medicine practiced in a evacuation hospital is inappropriate for a civic action project in nation-building in a Third World country.

Military manpower planners foresee the need for a three-tiered Army with conventional general-purpose forces to answer high-intensity threats in Europe or Korea, expeditionary forces to address low-intensity contingencies in the Third World countries, and nation-building forces to assist host nations in smothering insurgencies.[15] Although the high-intensity end of the conflict scale is the least likely, the NATO shield requires a heavy committment of current and future resources to remain an effective (i.e., believable) deterrent. Manpower, equipment, mobilization, and surge requirements vary widely between each tier.

War medicine in each type of conflict also varies widely. Nation building and low-intensity conflicts may require a disproportionately large representation of combat support (CS) and combat service support (CSS) forces. Traditionally supportive activities, including medical activities, may become leading elements in meeting mission

tasks. Medical care in civic action projects does not involve the same specialty mix as would occur in a high-intensity conflict. [16]

A large part of CSS for high-intensity conflict is allocated to Reserve units. Active-duty medical resources must support day-to-day health care and answer immediate surge support requirements for expeditionary or nation-building missions. War medicine in all three scenarios will require of active duty doctors that they know: how the system works to supply personnel, equipment, and expendables; how to survive and provide top quality medical care in a field environment (and instruct others in the art); what medical hazards endanger soldiers deployed in the area of operation and what should be done to counter the menace.

In brief, medical readiness in the AMEDD requires that the AMEDD: (a) obtain and retain good doctors who practice good medicine, (b) familiarize these doctors with war medicine, (c) provide medical support for the rest of the Army as it plans and trains, (d) develop the medical systems, equipment, and doctrine to promote the best possible medical care in peace or in war.

Medical Centers and GME

Medical readiness begins with peacetime medical care by Army doctors, but the system is truly supportive of the readiness mission

only if it helps AMEDD soldiers to acquire and maintain war medicine knowledge and skills. The Army has an integrated health care system of medical centers, community hospitals, health clinics, and troop medical clinics. Since the diseases and injuries of the battlefield test the abilities of the most capable physicians, each generation of combat experienced soldier-physicans has incorporated the lessons learned into the peacetime Army health care system. Key aspects of this evolution include the following:

(a) Army doctors must have adequate experience with complex medical and surgical problems to maintain their war medicine capabilities. The medical problems of retirees constitute the major source of this challenging experience for Army physicians.

(b) Through its medical centers, the AMEDD ensures that Army physicians may aspire to the highest level of professional achievements and still remain within the Army system at MEDDACs as well as MEDCENs. Outstanding physicians are attracted by opportunities to associate and practice with other outstanding physicians even if only a few of them wish to be academicians on the teaching staff of medical centers.

(c) GME in Army hospitals produces most of the specialists needed to provide the best possible medical care to soldiers in both

peace and war.

(d) Without medical centers, little or no GME could even occur within the Army.

(e) Without GME, the MEDCENs would be medical centers in name only and top level (tertiary level) medical care would gradually disappear from the Army as medical leaders fled to those civilian institutions which support medical achievement.

(f) Army medical centers must be located in major cities where large numbers of retirees reside, medical school affiliations are practical, and a wide spectrum of civilian specialty consultants are immediately available to support GME and tertiary level care in the absence of Army consultants. [7]

(g) GME forms an immediately available manpower pool to meet surge requirements, expecially in those unexpected situations that suddenly develop at the low end of the conflict scale.

The present system of medical-center-based GME clearly supports medical readiness very effectively. The number of medical centers, types of training programs offered, and distribution of doctors within the AMEDD rest in part on day-to-day patient care requirements, and in part on forecasted needs; but it is evident that high quality patient care today is a fundamental aspect of medical readiness

tomorrow. Changes or adjustments in Army GME and Army medical centers may seem quite innocuous; but any change can have potentially profound, relatively permanent effects on the battlefields of the future. Peacetime patient care, graduate medical education, medical centers, and medical readiness are so mutually interactive that proposals for major changes warrant very thorough review to preclude disastrous, unanticipated consequences of well-intentioned, but simplistic "improvements."

Outside pressures, however, are forcing changes in Army GME. Army GME programs must meet civilian accreditation standards and those standards have become increasingly restrictive. Many GME programs are mutually dependent, e.g., radiology residencies must be in institutions offering surgery residencies. Additional pressures include requirements for more specialty consultants, evidence of academic endeavors by teachers and students, and increasing emphasis on supervision of residents by subspecialists. Resident Review Committees (RRCs) of the ACGME review training programs at four year (or less) intervals. The changes necessary to meet new requirements after these reviews invariably seem to require more doctors and more money. The AMEDD has been stretched to the limit. Army residency programs have been closing because the

resource requirements proved too costly in personnel despite there proven cost effectiveness. [17]

The AMEDD has some control over program closures by prioritizing available resources. The long lead time before an essential subspecialist becomes available, the small numbers in some specialty or subspecialties, the devasting impact even one key individual's retirement or resignation can have on an otherwise solid residency program, the requirement to reaccredit a program as completely new if it transfers to another hospital, and the small numbers of potential academicians relative to the number required by the size of GME; are all factors working against AMEDD efforts to control which GME programs will endure.

Yet years of experience have confirmed GME as essential for top quality medical care and medical readiness. As programs close, teaching physicians leave, opportunities diminish for a "top gun" to rise to the top of his profession in the Army, and workloads of the remaining physicians snowball; the AMEDD will inevitably face a long-term decline in quality of patient care and medical readiness that will require Draconian measures to correct. [18]

Proposals for the Future

A significant increase in the manpower ceiling for physicians would correct much of these problems, but could occur only at the expense of the rest of the Army. The tooth-to-tail ratio is already viewed as excessively skewed in the wrong direction. The long lead time GME imposes before changes in input produce changes in output also diminishes the desirability of mere numerical juggling to counteract an historical trend.

Army doctors could be sent to civilian training programs and Army GME curtailed. Alternatively, a doctor draft could provide the specialists the Army needs and Army GME could be completely eliminated. It is clear by now, however, that an Army medical system without GME would be a second-rate system of health care in peace, staffed by physicians deficient in professional aspirations, and as ready to support soldiers in war as "the leeches of the days of Charlemagne."

In chapter 48 of his autobiography, General Omar Bradley describes introducing residency training into the VA medical system near the time it was introduced into the Army, and for much the same reason—to improve the quality of VA medical care by "luring able doctors to VA." Instead of operating stand-alone VA residency programs, he proposed that "existing and planned VA hospitals be formally affiliated with class-A medical teaching institutions. This would not only enable the VA to benefit from the know-how, talent and prestige of those institutions but also gain the services of hundreds of interns and residents who could treat veterans under supervision of the teaching staffs."[19] These Deans Committee Hospitals have been cornerstones for quality VA medical care since the program started.[20]

An affiliation program similar to that of the VA has much to offer the Army. Army Medical Centers have already been located relatively close to civilian medical teaching centers to promote civilian support of Army GME. Many Army hospitals are already affiliated with civilian teaching centers to furnish a portion of the training for Army residents, or for Army support of civilian GME. A complete affiliation program, however, involves some far-reaching changes.

Under this proposal the stand-alone Army GME programs would cease their independent existence. Key aspects of this proposal include:

(a) Army medical centers would affiliate with civilian teaching centers to serve as teaching hospitals for civilian residents. GME would be preserved (or even extended) in the Army system with its positive effects on quality of patient care throughout the entire health care system.

(b) The HPSP scholarship program would be extended to continue funding during GME, but only for those who continue their training in the civilian programs affiliated with Army hospitals.

(c) These HPSP-type residents would remain in the Reserves, and serve their annual ADT with field units. Their exposure to field medicine would equal, or even exceed, the exposure Army residents enjoy in the present system.

(d) The active duty slots filled by residents and interns would be freed to permit improved staffing at MEDDACs, MEDCENs, and line units. Since the number of interns and residents in MEDCENs need not change, two of every three slots would not immediately revert back to the MEDCEN to handle the workload.

(e) Even without a scholarship program, the restructuring of Army GME could be effected, given acceptance of the basic premise that GME is an essential ingredient in any integrated system providing quality medical care. When Army programs close, the medical care formerly provided by residents and fellows can be met through contracts with civilian teaching institutions to provide the care in Army Hospitals. Such contracts can require the contractor to seek affiliation of the Army medical center as a teaching hospital for the civilian residency program.

(f) Each time a program converted to affiliation status, the Army man-power pool of potential academicians would increase. Fewer difficulties would ensue in finding sufficient teaching staff for the teaching centers as they affiliate with civilian programs.

(g) The proposal would be more expensive in dollars, but less expensive in personnel than Army stand-alone GME programs.

SUMMARY AND CONCLUSIONS

Army Graduate Medical Education, based on Army medical centers as part of an integrated health care system, contributes significantly to Army medical readiness. GME provides surge capability for sudden contingencies, promotes top quality medical care for soldiers, and has proved essential for luring able physicians to Army careers. Army GME programs are in trouble because Army resources are insufficient to meet all the escalating requirements. Although some programs can close without endangering quality medical care and medical readiness, the cutoff point is unclear in view of the complex inter-relationships between the five pillars of total Army medicine.

An affiliation system can be phased in to satisfy all the contributions Army GME makes to quality medical care and medical readiness with the exception of the surge response the present system offers. Medical centers should preserve GME through systematic affiliation rather than allowing tertiary level care to wither and die by default because the old way has failed.

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